

**University of Groningen**

## **Assessing genetic structure of thornback ray, *Raja clavata***

Chevolot, Malia Sylvaine Claude Odette Maëlle

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

2006

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Chevolot, M. S. C. O. M. (2006). *Assessing genetic structure of thornback ray, *Raja clavata*: A thorny situation?* s.n.

### **Copyright**

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### **Take-down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*

**Assessing genetic structure of thornback ray,  
*Raja clavata* : A thorny situation?**

Cover: *Raja clavata* and ray egg. Pictures from Malia Chevolot  
Lay out: Malia Chevolot

Printed by: Van Denderen b.v., Groningen

The research reported in this thesis was carried out at the Department of Marine Benthic Ecology and Evolution, Centre for Ecological and Evolutionary Studies (CEES), University of Groningen, PO Box 14, 9750 AA Haren, The Netherlands.

This research was supported by NWO-*Prioriteit Programma* "Sustainable Use of Marine Resources" Project Nr. 885-10-311

The printing of this thesis was financially supported by the University of Groningen and the CEES

ISBN: 90-367-2846-0

**RIJKSUNIVERSITEIT GRONINGEN**

**Assessing genetic structure of thornback ray,  
*Raja clavata*: A thorny situation?**

**Proefschrift**

ter verkrijging van het doctoraat in de  
Wiskunde en Natuurwetenschappen  
aan de Rijksuniversiteit Groningen  
op gezag van de  
Rector Magnificus, dr. F. Zwarts,  
in het openbaar te verdedigen op  
vrijdag 8 december 2006  
om 13.15 uur

door

Malia Sylvaine Claude Odette Maëlle Chevolot  
geboren op 13 mei 1978  
te Saint Renan, Frankrijk

Promotores:

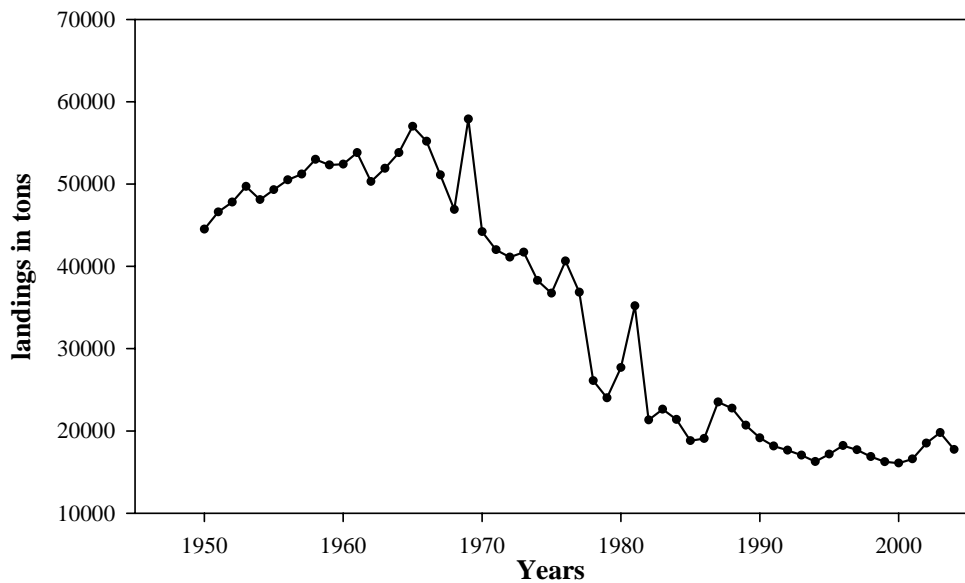
Prof. Dr. J.L. Olsen  
Prof. Dr. W.T. Stam  
Prof. Dr. A.D. Rijnsdorp

Beoordelingscommissie:

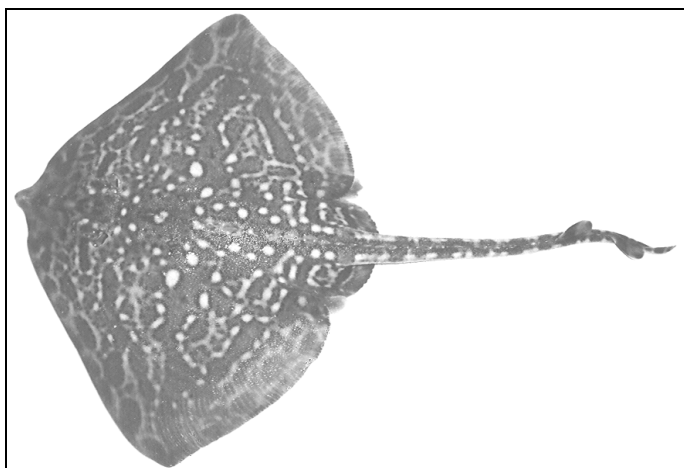
Prof. Dr. R. Bijlsma  
Prof. Dr. F.A.M. Volckaert  
Prof. Dr. W.J. Wolff

# CONTENTS

<b>Chapter 1</b>	General Introduction	6
<b>Chapter 2</b>	Characterization and isolation of DNA microsatellite primers in <i>Raja clavata</i> L. (thornback ray, Rajidae)	39
<b>Chapter 3</b>	Population structure of the thornback ray ( <i>Raja clavata</i> L.) in British waters	43
<b>Chapter 4</b>	Phylogeography and population structure of thornback rays	63
<b>Chapter 5</b>	Low effective population size but stable genetic diversity in the Irish Sea population of thornback ray, <i>Raja clavata</i>	85
<b>Chapter 6</b>	Multiple paternity analysis in the thornback ray <i>Raja clavata</i> L.	97
<b>Chapter 7</b>	Population structure and historical demography of the thorny skate ( <i>Amblyraja radiata</i> , Rajidae) in the North Atlantic	105
<b>Chapter 8</b>	Summary/Discussion	125
	Samenvatting/Discussie	131
	Résumé/Discussion	137
	Acknowledgements/ Remerciements/ Dankwoord	143
	Biography	147



**Fig. 1.** Landings of rays and skates from 1950 to 2004 in the NE Atlantic (FAO-Fishstat 2006).



**Fig. 2.** *Raja clavata* (Picture M. Chevolut)